

WHAT IS CLAIMED IS:

SUB A2/

1. A method for representing cartographic data in a computer-based system, comprising:
 - computing a plurality of wavelet and scaling coefficients corresponding to at least one function representing a geographic feature in a cartographic database; and
 - storing the wavelet and scaling coefficients in a computer-usable database, the coefficients being usable for representing the cartographic data in the computer-based system.
2. The method of claim 1, wherein the geographic feature is originally represented by a plurality of data points.
3. The method of claim 2, wherein the data points are selected from the group consisting of coordinate pairs and a coordinate triples.
4. The method of claim 1, wherein the geographic feature is the boundary of a feature selected from the group consisting of a road, waterway, building, park, lake, railroad track, and airport.
5. The method of claim 2, wherein the step of computing the wavelet coefficients and scaling coefficients includes applying a wavelet transform to a function defined by the data points representing the geographic feature.
6. The method of claim 1, wherein the step of computing the wavelet coefficients and scaling coefficients includes:
 - computing the wavelet coefficients by performing a least-squares fit.
7. The method of claim 1, wherein the wavelet and scaling coefficients are computed using a semi-discrete orthonormal wavelet transform.

1 8. A method of displaying on a computer output device a function representing a
2 geographic feature, comprising:
3 retrieving from a computer-usable database a plurality of wavelet and scaling
4 coefficients associated with the geographic feature, the coefficients being derived from a
5 plurality of data points specifying geographic locations according to a predetermined reference
6 system;
7 computing the function using the retrieved wavelet and scaling coefficients; and
8 displaying the function on the computer output device.
9

1 9. The method of claim 8, wherein the data points are selected from the group
2 consisting of coordinate pairs and a coordinate triples.
3

1 10. The method of claim 8, wherein the geographic feature is selected from the group
2 consisting of a road, waterway, building, park, lake, railroad track, and airport.
3

1 11. A system for displaying on a computer output device a representation of a
2 geographic feature, comprising:
3 a database storing a plurality of wavelet and scaling coefficients associated with
4 the geographic feature, the wavelet and scaling coefficients being derived from a plurality of
5 data points specifying geographic locations according to a predetermined reference system;
6 a processor configured to calculate a function using the wavelet and scaling
7 coefficients, the function representing the geographic feature; and
8 a display device for displaying the function.
9

1 12. The system of claim 11, wherein the data points are selected from a group
2 consisting of coordinate pairs and coordinate triples.
3

1 13. A method of generating a computer-usable database that represents cartographic
2 data using a plurality of wavelet and scaling coefficients, comprising:

3 providing a predetermined database that represents the cartographic data using a
4 plurality of data points specifying geographic locations;

5 computing a plurality of wavelet and scaling coefficients from the data points; and
6 storing the wavelet and scaling coefficients in the computer-usable database.

7
1 14. The method of claim 13, wherein the data points are selected from the group
2 consisting of coordinate pairs and coordinate triples.

3
4 15. The method of claim 13, wherein the geographic feature is the boundary of a
5 feature selected from the group consisting of a road, waterway, building, park, lake, railroad
6 track and airport.

7
8 16. A system for generating a computer-usable database that represents cartographic
9 data using a plurality of wavelet and scaling coefficients, comprising:

10 a first computer-usable database storing the cartographic data represented using a
11 plurality of data points specifying geographic locations;

12 a processor configured to compute a plurality of wavelet and scaling coefficients
13 from the data points; and

14 a second computer-usable database, operatively coupled to the processor, for
15 storing the wavelet and scaling coefficients.

16
17 17. The system of claim 16, wherein the data points are selected from the group
18 consisting of coordinate triples and coordinate pairs.

19
20 18. The system of claim 16, wherein the wavelet coefficients and scaling coefficients
21 are computed by applying a wavelet transform to a function defined by the data points
22 representing a geographic feature.

1 19. The system of claim 16, wherein the wavelet coefficients are computed by
2 performing a least-squares fit.
3

1 20. A method for generating a database error metric in a computer-based system,
2 comprising:
3 computing a first plurality of wavelet and scaling coefficients from a plurality of
4 first data points included in a first cartographic database;
5 computing a second plurality of wavelet and scaling coefficients from a plurality
6 of data points included in a second cartographic database; and
7 generating the database error metric based on a wavelet transform involving the
first and second pluralities of wavelet coefficients.

1 21. The method of claim 20, wherein the error metric is a total error metric based on a
2 plurality of wavelet scales.
3

1 22. The method of claim 20, further comprising:
2 selecting a wavelet scale; and
3 restricting the error computation to the selected wavelet scale to generate a layer
4 error metric.
5

1 23. The method of claim 14, wherein the data points are selected from the group
2 consisting of coordinate pairs and coordinate triples.
3

1 24. A system for generating a database error metric, comprising:
2 a first cartographic database for storing a first plurality of data points;
3 a second cartographic database for storing a second plurality of data points; and
4 a processor, operatively coupled to the first and second cartographic databases,
5 configured to compute a first plurality of wavelet and scaling coefficients and a second plurality
6 of wavelet and scaling coefficients, respectively, from the first and second pluralities of data
7 points, the processor generating a database error metric based on the first and second pluralities
8 of wavelet and scaling coefficients.

